

Claims:

1.

1 A child-resistant package that includes:
2 a container having a cylindrical finish with an open end, at least one
3 external thread and at least one stop lug separate from said at least one external
4 thread and projecting radially outwardly from said finish, and
5 a closure having a base wall, a skirt with at least one internal thread for
6 engagement with said at least one external thread on said finish, at least one pair
7 of internal lugs on said skirt and extending radially inwardly from said skirt, and
8 at least one spring element operably associated with said open end of said finish
9 to bias said closure axially of said finish,
10 said at least one pair of lugs on said skirt including a first lug for
11 cooperating with said at least one stop lug on said finish to prevent unthreading
12 of said closure from said finish absent pressure on said closure against said spring
13 element to push said first lug on said skirt beneath said at least one stop lug on
14 said finish, and a second lug circumferentially spaced from said first lug for
15 cooperating with said at least one stop lug on said finish to prevent further
16 threading of said closure onto said finish.

2.

1 The package of claim 1 wherein said at least one stop lug on said finish
2 has a cam surface and said first lug on said skirt has a cam surface adapted to
3 engage a stop lug on said finish and displace at least a portion of the closure to
4 permit the first lug to pass said at least one stop lug when the closure is threaded
5 onto said finish.

3.

1 The package of claim 2 wherein the cam surface of the stop lug and the
2 cam surface of the first lug are inclined axially so that the first lug passes beneath
3 said at least one stop lug when the closure is threaded onto said finish.

4.

1 The package of claim 3 wherein the spring element is increasingly
2 displaced against its bias as the first lug passes beneath said at least one stop lug,
3 and after the first lug has passed said at least one stop lug the spring element
4 returns toward its undisplaced position to raise the first lug and at least partially
5 axially align the first lug with said at least one stop lug.

5.

1 The package of claim 2 wherein said at least one stop lug on said skirt
2 includes a pocket circumferentially spaced from said cam surface of said at least
3 one stop lug, said pocket including a radially outwardly extending flange located
4 so that it axially overlies at least a portion of said first lug when said first lug has
5 passed said at least one stop lug.

6.

1 The package of claim 5 wherein said flange extends circumferentially a
2 distance so that the flange overlies at least a portion of the first lug throughout the
3 range of rotation of the closure relative to the finish permitted between
4 engagement of said first lug with said at least one stop lug and said second lug
5 with said at least one stop lug.

7.

1 The package of claim 5 wherein said first lug includes a circumferentially
2 extending surface adapted to engage the flange of said at least one stop lug to at
3 least inhibit significant axial displacement of the closure relative to the finish
4 when the first lug is received in said pocket.

8.

1 The package of claim 6 wherein said first lug includes a circumferentially
2 extending surface generally opposed to said flange and adapted to engage the
3 flange of said at least one stop lug to at least inhibit axial displacement of the
4 closure relative to the finish when the first lug is received in said pocket.

9.

1 The package of claim 8 wherein the adjacent surfaces of the first lug and
2 the flange are generally planar and parallel to each other.

10.

1 The package of claim 1 wherein said at least one stop lug includes a
2 radially and axially extending stop surface adapted to engage said first lug when
3 said closure is fully threaded on said finish to prevent said closure from being
4 removed from said finish until the closure is axially displaced against the bias of
5 the spring element sufficiently to permit the first lug to pass beneath said stop
6 surface and said at least one stop lug.

11.

1 The package of claim 5 wherein said at least one stop lug includes a
2 radially and axially extending stop surface that defines at least part of said pocket
3 and is adapted to engage said first lug when said closure is fully threaded on said
4 finish to prevent said closure from being removed from said finish until the
5 closure is sufficiently axially displaced against the bias of the spring element to
6 permit the first lug to pass beneath said stop surface and said at least one stop lug.

12.

1 The package of claim 1 wherein said at least one stop lug is axially spaced
2 from said external thread.

13.

1 The package of claim 1 wherein said first and second lugs are axially
2 spaced from said internal thread of said skirt.

14.

1 The package of claim 1 wherein said first lug has a cam surface adapted
2 to engage said at least one stop lug and permit said first lug to pass over said at
3 least one stop lug when threading said closure on said finish, the cam surface
4 extending circumferentially and being radially sloped so that when said closure
5 is threaded on said finish the cam surface initially engages said at least one stop
6 lug at the radially innermost end of the cam surface and is rotated toward the
7 radially outermost end of the cam surface.

15.

1 The package of claim 1 which also includes a spring stop carried by the
2 closure and adapted to engage said at least one spring element to limit
3 displacement of said at least one spring element.

16.

1 The package of claim 15 wherein said at least one spring element includes
2 a resilient member carried at one end by the base wall, extending axially from the
3 base wall and inclined radially inwardly with said spring stop being disposed
4 radially inwardly from said one end of said at least one spring element.

17.

1 The package of claim 1 said at least one spring element includes a
2 plurality of spring segments each cantilevered to at least one of the base wall and
3 the skirt and having a free end that is flexible and resilient.

18.

1 The package of claim 1 wherein said stop lug has an upper surface
2 disposed generally perpendicular to an axis of the finish.

19.

1 A container for a child-resistant package, including:
2 a cylindrical finish having an axis and an open end, at least one external
3 thread and at least one stop lug separate from said at least one external thread and
4 projecting radially outwardly from said finish, said stop lug having a cam surface
5 and a radially outwardly extending flange spaced clockwise from the cam surface
6 and disposed closer to said open end than at least a portion of said cam surface.

20.

1 The container of claim 19 wherein said cam surface extends
2 circumferentially and is inclined axially so that the distance from said open end
3 to said cam surface is greater at one end of the cam surface than at the other end.

21.

1 The container of claim 20 wherein said one end of the cam surface is
2 spaced clockwise from said other end of the cam surface.

22.

1 The container of claim 19 wherein said stop lug has a stop surface spaced
2 clockwise from said cam surface, said stop surface extending radially outwardly
3 and generally axially from said finish.

23.

1 The container of claim 22 wherein at least a portion of said stop surface
2 is disposed further axially away from said open end than said flange to define at
3 least part of a pocket between the stop surface and the flange adapted to receive
4 a complementary lug on a closure to inhibit displacement of said complementary
5 lug toward said open end of said finish.

24.

1 The container of claim 19 wherein said cam surface extends
2 circumferentially and is inclined radially so that the distance from the axis of said
3 finish to said cam surface is greater at one end of the cam surface than at the other
4 end.

25.

1 The container of claim 20 wherein said one end of the cam surface is
2 spaced clockwise from said other end of the cam surface.

26.

1 A child-resistant package that includes:
2 a container having a cylindrical finish with an open end, at least one
3 external thread and at least one lug separate from said at least one external thread
4 and projecting radially outwardly from said finish adjacent to an end of said
5 thread remote from said open end, and
6 a closure having a base wall, a skirt with at least one internal thread for
7 engagement with said at least one external thread on said finish, at least one

8 internal lug on said skirt adjacent to an end of said internal thread remote from
9 said base wall, and at least one spring element for engaging said open end of said
10 finish to bias said closure axially of said finish;
11 said at least one lug on said container finish having an axially oriented
12 cam face that slopes in a clockwise direction away from said open end,
13 said at least one lug on said closure skirt having an axially oriented cam
14 face that slopes toward said base wall such that threading said closure onto said
15 finish in a clockwise direction causes said at least one lug on said skirt to cam
16 axially away from said open end relative to said at least one lug on said finish by
17 compression of said at least one spring element.

27.

1 The package of claim 26 wherein said at least one lug on said finish has
2 a flange that extends circumferentially in a clockwise direction from a surface of
3 said lug adjacent to said open end.

28.

1 The package of claim 26 wherein said closure includes a second lug on
2 said skirt that is axially aligned with said at least one lug on said container finish
3 when said closure is fully received on said container finish so that said second lug
4 engages said at least one lug on said container finish to limit clockwise rotation
5 of said closure relative to said container finish.

29.

1 The package of claim 27 wherein said flange includes a generally planar
2 surface facing away from said open end, and said at least one lug on said skirt has
3 a complementarily oriented surface adapted to be received closely adjacent to said
4 generally planar surface of said flange to inhibit axial displacement of said at least
5 one lug on said skirt in a direction toward said open end of said container finish.

30.

1 A closure for a child-resistant package, including:
2 a base wall,
3 a skirt with at least one internal thread adapted for engagement with at
4 least one external thread on a container finish,
5 at least one pair of internal lugs on said skirt spaced from said at least one
6 internal thread and extending radially inwardly from said skirt, and
7 at least one spring element carried by one of said base wall and said skirt,
8 said at least one pair of lugs on said skirt including a first lug for
9 cooperating with a stop lug on a container finish to prevent unthreading of said
10 closure from said finish absent pressure on said closure against said spring
11 element to push said first lug on said skirt beneath the stop lug on the container
12 finish, and a second lug circumferentially spaced from said first lug for
13 cooperating with the stop lug on the container finish to limit the threading of the
14 closure onto the container finish.

31.

1 The closure of claim 30 wherein the first lug has a stop surface facing one
2 direction and the second lug has a stop surface facing generally in the opposite
3 direction of said one direction so that the stop lugs limit rotation of the closure
4 in opposite directions.

32.

1 The closure of claim 31 wherein the stop surface of the first lug faces
2 counterclockwise and the stop surface of the second lug faces clockwise.

33.

1 The closure of claim 30 wherein said first lug has a cam surface
2 extending circumferentially and inclined axially.

34.

1 The closure of claim 30 wherein said first lug has a cam surface
2 extending circumferentially and inclined radially.

35.

1 The closure of claim 30 wherein said at least one spring element includes
2 a plurality of circumferentially spaced spring segments, each spring segment
3 being cantilevered to at least one of the base wall and the skirt and having a free
4 end that is flexible and resilient.

36.

1 A method of making a child resistant package, including the steps of:
2 forming a container having a cylindrical finish with an open end, at least
3 one external thread and at least one stop lug separate from said at least one
4 external thread and projecting radially outwardly from said finish,
5 forming a closure having a base wall, a skirt with at least one internal
6 thread for engagement with said at least one external thread on said finish, at least
7 one spring element carried by one of the skirt and the base wall and operably
8 associated with said open end of said finish to bias said closure axially of said
9 finish, and at least one pair of internal lugs on said skirt and extending radially
10 inwardly from said skirt and including a first lug for cooperating with said at least
11 one stop lug on said finish to prevent unthreading of said closure from said finish
12 absent pressure on said closure against said spring element to push said first lug
13 on said skirt beneath said at least one stop lug on said finish, and a second lug
14 circumferentially spaced from said first lug for cooperating with said at least one
15 stop lug on said finish to prevent further threading of said closure onto said finish.

37.

1 The method of claim 36 wherein said step of forming said closure
2 includes forming said spring element integrally with said base wall and said skirt.

38.

1 The method of claim 37 wherein said base wall, skirt and spring element
2 are formed as a single piece of molded plastic construction.

39.

- 1 The method of claim 36 wherein said at least one spring element is
- 2 formed by providing a plurality of spring segments cantilevered to at least one of
- 3 the base wall and the skirt and having a free end that is flexible and resilient.